

Patent claims:

1. An optical subassembly with an optical element that has an optical surface and bearing points arranged on the circumference, the optical element being connected to a mount at the bearing points via connecting elements, characterized in that stress-decoupling cutouts (11) are arranged between the optical surface (9) and the bearing points (12).
2. The optical subassembly as claimed in claim 1, characterized in that the cutouts are formed as slots (11).
3. The optical subassembly as claimed in claim 2, characterized in that the slots (11) have at least approximately a curved shape.
4. The optical subassembly as claimed in claim 3, characterized in that, in its course, the curved shape is at least approximately matched to the external course of the optical surface (9).
5. The optical subassembly as claimed in claim 2, characterized in that the slots (11) are designed to be continuous in the axial direction.
6. The optical subassembly as claimed in claims 1 to 5, characterized in that the optical element (7) is formed as a lens.

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7. The optical subassembly as claimed in claims 1 to 5, characterized in that the optical element (7) is formed as a mirror element.

5 8. The optical subassembly as claimed in claim 7, characterized in that the mirror element (7) has a mirror part (8) with the optical surface (9) and a base part (10).

10 9. The optical subassembly as claimed in claim 8, characterized in that the mirror part (9) and the base part (10) are formed in one piece.

10. The optical subassembly as claimed in claim 8, characterized in that the cutouts (11) are arranged in the
15 base part (10).

11. The optical subassembly as claimed in claim 1 to 10, characterized in that at least one of the cutouts (11)
20 is simultaneously provided for the passage of a projection beam.

12. The optical subassembly as claimed in claim 1, characterized in that connecting elements (15-18) are provided whose clamping forces can be adjusted.
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13. The optical subassembly as claimed in claim 12, characterized in that the connecting elements have clamping elements (15-17) which connect the bearing
30 points (12) to the mount (13) with a force fit.

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14. The optical subassembly as claimed in claim 13, characterized in that the clamping elements (15, 16) are each connected to the mount by screw connections (17).

5 15. The optical subassembly as claimed in claim 14, characterized in that the screw connections (17) are provided with spring elements (18), via which a preselected preclamping force can be set.

10 16. The optical subassembly as claimed in one of claims 12 to 15, characterized in that three bearing points (12) are arranged distributed on the circumference of the optical element (7), each bearing point (12) being connected to the mount (13) via at least one connecting joint (14).

17. The optical subassembly as claimed in claim 16, characterized in that the at least one connecting joint (14) is designed to be stiff in two directions.

20 18. The optical subassembly as claimed in claim 17, characterized in that the at least one connecting joint (14) is designed to be stiff in the tangential direction and in the axial direction.

25 19. The optical subassembly as claimed in one of claims 16 to 18, characterized in that two bearing feet are provided for each bearing point (12) as connecting elements (14).

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20. The optical subassembly as claimed in claim 19, characterized in that the two bearing feet (14) are arranged in the form of a bipod (14a, 14b).

5 21. The optical subassembly as claimed in one of claims 16 to 20, characterized in that the connecting elements (14) are formed as solid-body joints with slots.

10 22. A projection objective in semiconductor lithography having at least one optical subassembly with an optical element which has an optical surface and bearing points arranged on the circumference, the optical element being connected to a mount at the bearing points via connecting elements, characterized in that stress-decoupling cutouts (11) are arranged between the optical surface (9) and the bearing points (12).

15 23. The projection objective as claimed in claim 22, characterized in that the optical element (7) is formed as a lens.

20 24. A projection objective in semiconductor lithography having at least one optical subassembly with a mirror element which has an optical surface and bearing points arranged on the circumference, the mirror element being connected to a mount at the bearing points via connecting elements, characterized in that stress-decoupling cutouts (11) are arranged between the optical surface (9) and the bearing points (12).

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25. The projection objective as claimed in claim 24, characterized in that the cutouts are at least approximately formed as curved slots (11).

5 26. The projection objective as claimed in claim 24, characterized in that the mirror element (7) has a mirror part (8) with the optical surface (9) and a base part, the mirror part (8) and the base part (10) being formed in one piece.

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27. The projection objective as claimed in claim 24, characterized in that the connecting elements have clamping elements (15-17) which connect the bearing points (12) to the mount (13) with a force fit.

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28. The projection objective as claimed in claim 27, characterized in that the clamping elements (15, 16) are connected to the mount (13) via screw connections (17) with spring elements (18), via which a preselected preclamping force can be set.

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29. The projection objective as claimed in claim 24, characterized in that at least the mirror element (7), the connecting elements (14) and the mount (13) are formed of materials with very low thermal expansion coefficients.

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30. The projection objective as claimed in claim 29, characterized in that a mirror element comprising a mirror part with an optical surface (9) and a base part (10) connected to the latter in one piece is formed of glass ceramic.

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31. The projection objective as claimed in claim 29, characterized in that at least some of the connecting elements (14) are formed of Invar.

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32. The projection objective as claimed in claim 29, characterized in that the mount (13) is formed of ceramic.